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N<sup>o</sup> 13,798



A.D. 1892

*Date of Application, 29th July, 1892*

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PROVISIONAL SPECIFICATION.

**Improvements in Raising and Supporting Venetian Blinds and other similarly Accumulating Weights.**

I, JOSEPH SAMUEL ORTON of 38 Wheeler Street, Birmingham, in the County of Warwick Mechanician, do hereby declare the nature of this invention to be as follows :—

This invention relates in part to improvements applicable to, and for the  
 5 perfection of parts of an invention for "Improvements in Raising and Supporting Venetian Blinds and other similarly Accumulating Weights" for which Letters Patent, No. 10,177 for 1888 were granted—parts of which patented invention together with the improvements to be hereinafter described constitute this invention  
 10 of a new combination of parts of mechanism, which is intended to work or be worked more beneficially than the said prior invention.

The object of this invention is to produce a new combination of parts of mechanism in a compact and useful manner or form—which said combination shall include means for preventing derangement or displacement of the cords employed for the transmission of motion,—means for the regulation of the degree of power or  
 15 resilient force exerted by the spring, employed for producing counteracting motion, in proportion to the number of the revolutions made by its rotating end, and means for facilitating the raising and lowering of certain kinds of such said blinds or similarly accumulating weights.

In accordance with this invention—as in my former invention—the variable  
 20 weight or strain on the lifting cords of a Venetian blind, or of any similarly accumulating weight or strain, may be constantly sustained both in being raised and lowered, and retained when at rest, in a state of equilibrium with another or a counteracting power or force,—as for instance, the resisting or resilient force of a spring.

One arrangement of this invention may be described as follows :—The lifting  
 25 cords of a Venetian blind, or of similarly accumulating weights, may be suspended from a rotating drum or roller (which for convenience of description will be hereinafter referred to as the main roller) which, with other rotating parts in the same axial line is supported on pivots in suitable bearings, which, with all other bearings  
 30 hereinafter mentioned, are securely fixed to or on a travelling board which has an end or longitudinal movement imparted to it during the simultaneous rotation of the main roller, by means suitable to cause the lifting cords to coil and to uncoil thereon and therefrom. The said travelling board is supported by and upon  
 85 antifriction rollers or spheres, rolling between it and a stationary board, which may support the tapes of the blind. Attached to the main roller, or forming part of it—say at its right hand end—is a conical or conoidal part, or a part varying in diameter between its extremes or ends—(hereinafter referred to as the first cone)—and, preferably, with its smaller end next to, or against the bearing which supports it in combination with contiguous parts of the main roller. In a second axial line  
 40 parallel to the axis of the main roller and first cone, a second cone, placed inversely to the first, with respect to the diameters of its ends rotates on pivots securely fixed in its ends, supported in suitable bearings, and, when the coiling portions of the lifting cords have been entirely coiled upon the main roller the maximum length intended, one end of another cord, the extremity of which is securely attached at  
 45 r to the base of the first cone, extends to the smaller end of the second cone, and, with the parts as now presented, the remainder of it lies coiled within a spiral groove in the surface of the latter cone, of sufficient length to take up a portion or length of this cord, equal to the portion of it which is intended to coil and uncoil

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upon or from the first cone, and which groove extends spirally from the smaller end of the second cone and terminates at its base, where the other extremity of the said cord is securely attached.

When a combination of parts in accordance with this invention is employed for raising lowering and supporting a comparatively small and light Venetian blind 5 which may be conveniently raised and lowered by imparting motion directly by hand to the bottom of the blind,—the pivot which is firmly fixed in the smaller end of the second cone extends beyond its bearing and is centrally and securely fixed in the end of a roller or bar of sufficient length to extend from end to end, through and beyond the end of a suitable encircling spiral spring, and which said roller or 10 bar terminates by or with a pivot supported in a bearing. One end of the said spring is secured to the travelling board, and when this spring has been suitably “charged” or wound up, its other end is securely attached to the roller or bar. The blind may then be placed higher or lower by hand and will remain in any position as placed. But when a combination of parts in accordance with this 15 invention is employed for raising lowering and supporting a comparatively large and heavy Venetian blind where it would be inconvenient to raise and lower it wholly in the manner last described for a small and light Venetian blind, and where a greater degree of variation of transmitted power may be required :—instead of employing the last named roller and spring in the position indicated, the pivot 20 fixed in the smaller end of the second cone is formed into a rod or spindle which extends to a length somewhat greater than the length of the parallel portion of the main roller. The extremity of this rod forms a pivot securely fixed in the smaller end of a third cone, grooved similarly to the second cone, and this said pivot and the pivot secured in the base of the same cone are supported by, and rotate in 25 suitable bearings.

Situated opposite to the third cone, at the left hand end of the main roller, and rotating in the same axial line, is a fourth cone, provided with pivots securely fixed in its ends, and supported by suitable bearings,—and the first and second 30 cones being in the position—with respect to their rotation—as last described, a cord of which one extremity is securely attached at and to that end of the spiral groove, which is near the base of the third cone, extends to the nearer or smaller end of the fourth cone, and a portion of it about equal in length to the length of the spiral groove in the third cone having been properly coiled upon the fourth 35 cone, its remaining end is securely attached at and to the base of the latter. The main roller is constructed hollow so that it may form a receptacle for certain parts, to be next described herein, without being in contact with them. The pivot in the smaller end of the fourth cone extends beyond its bearing through a corresponding hole in the centre of a disc, which rotates upon the said pivot and constitutes one 40 end of the main roller, and the said pivot projects axially for a convenient distance into the interior of the main roller, and rotates in a central hole in, while affording support to, the end of a longitudinal stationary bar which extends from end to end, through and beyond a suitable encircling spiral spring and terminates by having in its end a securely fixed pin or rod, which, projecting axially through a suitably 45 corresponding hole through the centre of the first cone is supported by its bearing and forms a stationary pin or pivot upon which the first cone rotates. The rotating end of the spring is securely attached by suitable means to a convenient part of the extended pivot of the fourth cone, and its other end may be similarly attached to the stationary bar or pin :—by turning or rotating the latter in the proper 50 direction, and then securing it in position, the said spring may be properly “charged” or wound up, and the blind supported in a state of equilibrium.

To facilitate the raising and lowering of a Venetian blind supported as last described, the proper ends of two pendent cords—or two pendent portions of one cord hanging in a loop—may be so secured or attached to any convenient part or 55 parts of the main roller—or any suitable part in the same axial line by which the blind may be raised or lowered—that, while the upper portion of the one in ascending is being coiled upon one part, the upper portion of the other in descending

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is being uncoiled simultaneously,—so that, while the proper cord is being drawn down, the blind and the other cord ascend, and when the latter cord is drawn down the blind also descends, while the former is ascending and being recoiled. Or, in accordance with this invention, instead of applying these cords in the manner stated, 5 a roller or drum may be secured on and to the spindle which carries the second and third cones, or, which is preferred, this roller may be placed so that an elongated pivot secured in the base of the second cone may pass centrally and be secured in one of its ends, while its other end is provided with a pivot with a suitable bearing. Then—the upper ends of these cords being suitably secured to and disposed upon 10 the said roller, while one of these cords uncoils therefrom the other coils thereon, and so *vice versa*,—and by drawing down the one cord or the other respectively results are obtained similar to those just herein before described. In order to prevent possible derangement or displacement of the cord which is attached to the first and second cones and to maintain it in a state of tension proper to ensure its 15 coiling and uncoiling in and from the spiral groove in the second cone and in its proper position on the first, independently of the tension produced by the weight of the blind—a spring, or a weight as a power, may, in accordance with this invention, be applied and employed to effect this purpose:—for instance the resilient force of a spring may be employed for this purpose by attaching one end of it, directly or 20 indirectly, to one or the other of the said cones in such a manner as to tend to cause the cord attached to it to coil thereon, and, the spring having the proper resisting force imparted to it, its other end may be secured to any suitable part, whether stationary or otherwise.

The degree of the resisting force of the spiral spring, first named herein, in 25 relation to or proportion with the number of revolutions necessary to impart that degree of resilience, may be varied or regulated in accordance with this invention by a cylindrical part which slides in—say in a stationary end—and in contact with its surrounding coils of, the said spring. By the advancement of the said part further within the said end of the spring, the resilient force of the latter, in 30 proportion to the number of revolutions necessary to be imparted to its other end to produce that force, may be gradually increased.

The worm or screw by the rotation of which, in a stationary nut, the travelling board is caused to move to and fro longitudinally may be secured to other rotating parts either in the first or in the second axial line herein indicated or mentioned.

35 Dated this Twenty-eighth day of July 1892.

JOSEPH SAMUEL ORTON.

## COMPLETE SPECIFICATION.

## Improvements in Raising and Supporting Venetian Blinds and other similarly Accumulating Weights.

40 I, JOSEPH SAMUEL ORTON of 38 Wheeler Street Birmingham in the County of Warwick Mechanician do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates in part to improvements applicable to and for the perfection 45 of parts of an invention for "Improvements in Raising and Supporting Venetian Blinds and other similarly Accumulating Weights" for which Letters Patent No. 12,177 for the year 1888 were granted—parts of which patented invention together with the improvements to be herein after described, constitute this invention of a new combination of parts of mechanism which is intended to work or to 50 be worked more beneficially than the said prior invention.

The object of this invention is to produce a new combination of parts of mechanism in a compact and useful form or manner and to provide means for facilitating the raising and lowering of such said blinds, and other similarly accumulating weights.

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In accordance with this invention—(as with my former invention),—the variable weight or strain on the lifting cords of a Venetian blind (or of any similarly accumulating weight or strain) may be constantly sustained,—both in being raised and lowered and retained when at rest,—in a state of equilibrium with another or a counteracting power or force;—as, for instance, the resisting or resilient force of a spring.

I will now proceed to describe with reference to the accompanying drawings forming part of this Specification the mode or manner in which this invention is to be, or may be, carried into practical effect.

In the accompanying drawings,—

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Figs. 1 and 2, (Sheet 1), in plan and in elevation respectively, represent an arrangement or combination of parts of mechanism illustrative of one form of this invention

In Sheet 1, *a, a* and *a* represent the slats, and *b, b* and *b* the tapes of a Venetian blind of the ordinary construction. *c, c* and *c* are the lifting cords by means of which the slats of the blind are raised and lowered. The upper extremities of the cords *c, c* and *c* are securely attached to the drum or roller *d* at suitable points, so that by the rotation of *d* in the proper direction, and by the simultaneous longitudinal or endway movement to be herein after described, the cords *c, c* and *c* are caused to coil thereon or to uncoil therefrom. *e* is a conical or conoidal part employed as a fusee, which may be formed hollow and securely fitted on, and affixed to the end of the drum or roller *d*,—or otherwise so attached as to always rotate simultaneously therewith,—and which in this arrangement of this invention is preferably formed with a spiral groove of a pitch so varied or graduated in degree that the length of the groove in one half of the length of *e* may be equal to the length of the groove in the other half of it. The roller *d* and part *e* combined as described are supported by the pivots *f* and *g* rotating respectively in the part 1 of the bearing *h*, and the part 3 of the bearing *i*, which are both supported by, and firmly secured upon and to the bars *j* and *k*, which latter are supported by, or carried upon, the antifriction rollers indicated by each *l*, which roll in the recesses indicated by each *m* in the board *n*, from which depend or hang the tapes of the blind in the ordinary manner as shewn in Fig. 2. The pivot *f*, firmly fixed and secured in *e*, extends beyond the bearing *h*, and is constructed with a screw or thread indicated by *o* and inclined as shewn, and which screw engages in the stationary nut *p* in the upper part of the standard *q*, properly made fast to the board *n*. With one extremity securely attached at and to a part at the base of *e*, and so as to coil within and to uncoil from the groove in the said cone *e*, is the cord *r*, which passes in a right line to and from, and coils within and uncoils from, the spiral groove of varied pitch,—similar to that in the cone *e*,—formed in the surface of a second cone, conoid or fusee *s*, rotating in a second axial line parallel to the axis of the first cone *e*, and disposed or placed inversely, with respect to the diameters of its ends, to the said first cone, as illustrated in Fig. 1. The other extremity of the cord *r* is securely attached at and to a part at the base of *s* as shewn. When the cord *r* lies within and fills the groove in *e*, the said cord passes in a right line from a point near the smaller end of *e* to a point near the base of *s*, and when the same cord lies within and fills the groove in *s*, the said cord then passes in a right line from a point near the base of *e* to a point near the smaller end of *s*. The cone *s* is provided with a pivot *t* fixed in its base, and rotating in a suitable hole in the part 2 of the bearing *h*, and with another pivot *u*, firmly fixed and secured in its smaller end, rotating in a hole in the bearing *v*, which is firmly secured to *k*. The pivot *u* extends beyond the bearing *v*, and rotates freely in a central hole in, and supports the near end of, the rod or bar *w*, and the cylindrical part *x* is carried upon and made firmly fast to *u*. At the other end of the bar *w* is a central rod or pin *y* rigidly fastened in *w*, and the bar *w* and pin *y* are held stationary, or prevented from rotating, by the flattening of the pin *y* at the part where the said pin is dropped within and fits the suitable vertical slot indicated by 4 in the bearing *i*, as shewn in Fig. 1. The spiral spring *z* surrounds,

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and is supported by, the bar *w*, one end of the said spring being firmly fastened to the rotating part *x*, and the other end made fast to the bar *w*, both at the points indicated by the respective ends of the spring as shewn. By raising the pin *y* from out of the slot at *t* in the bearing *i*, and rotating the parts *w* and *y* in the proper direction, the spring *z* may be "charged" or wound up to a proper degree, the pin *y* may then be dropped back into the said slot, and these stationary parts so retained.

The pitch of the grooves in the cones *e* and *s* is varied as herein before described, because, while the cone *e*, with other parts in combination, may rotate at a regular or uniform rate of speed, the speed of rotation of the cone *s* varies in comparison with that of the cone *e* in proportion to the difference between the diametrical dimensions of the parts of the cones between which the cord *r* may extend while in motion.

A and B represent two portions of cord, the upper extremities of which are fastened to the roller *d*, and which are each so disposed upon *d*, that while the cord A, by the proper rotation of *d*, is caused to uncoil therefrom, the cord B simultaneously coils thereon,—and, reversely, while the cord B is caused to uncoil from off *d*, the cord A at the same time coils thereon.

In Fig. 2 the blind is represented as being almost wholly raised to its extreme height, and if the cord A be pulled down, or the bottom of the blind be drawn down directly by hand, the cord A and the cords *c*, *c* and *c* will uncoil from the roller *d*, while the cord B simultaneously coils thereon, the rotating movement of the screw *o*, engaging in the stationary nut *p*, will cause the roller *d*, cone *e* and all the parts supported upon and by the bars *j* and *k* moving on the rollers *l* to travel to the right as represented by the drawing, the cord *r* will coil within the groove in *e*, while uncoiling from the groove in *s*, and the spring *z* will be further "charged" or wound up, and so exert an increased degree of resilience or resisting force, but as the portion of the cord *r*—(passing in a right line from the groove in *e* to the groove in *s*)—will extend from a smaller diameter of *e* to a larger diameter of *s* than at the commencement of the downward movement as indicated, the leverage, or mechanical advantage, gained in favour of the decreased weight on the cords *c*, *c* and *c*, will compensate for the increased resisting force of the spring *z*. In raising the blind by pulling down the cord B, or raising the bottom of the blind directly by hand, the conditions will be reversed, and leverage will be gained in favour of the decreased power of the spring *z* which will compensate for the increased weight on the cords *c*, *c* and *c*.

Thus the blind may be raised or lowered, and will remain, in *equilibrio* at any point that it may be desired that it shall rest.

Figs. 3 and 4 (Sheet 2) in plan and in elevation respectively, represent an arrangement or combination of mechanism illustrative of another form of this invention.

In Sheet 2, *a*<sup>1</sup>, *a*<sup>1</sup> and *a*<sup>1</sup> represent the slats, and *b*<sup>1</sup>, *b*<sup>1</sup> and *b*<sup>1</sup>, the tapes of a Venetian blind suspended from the board *n*<sup>1</sup> in the usual manner. The cords *c*<sup>1</sup>, *c*<sup>1</sup> and *c*<sup>1</sup> are employed and operate in relation to the roller *d*<sup>1</sup> similarly to the cords *c*, *c* and *c* in relation to the roller *d* herein before described in reference to, and shewn in Figs. 1 and 2 (Sheet 1). *e*<sup>1</sup> is a cone or conoid employed as a fusee, which may be formed hollow and securely attached to *d*<sup>1</sup>, and is constructed with a spiral groove of an even or uniform pitch.

The roller *d*<sup>1</sup> and cone *e*<sup>1</sup>, combined as described and shewn, are supported by the pivots *f*<sup>1</sup> and *g*<sup>1</sup> rotating respectively in the part 1 of the bearing *h*<sup>1</sup> and in the part 3 of the bearing *i*<sup>1</sup>, the said bearings being securely fastened upon and to the travelling bars *j*<sup>1</sup> and *k*<sup>1</sup>, and the said bars being supported upon the antifriction rollers *l*<sup>1</sup> rolling in the recesses, indicated by each *m*<sup>1</sup>, in the board *n*<sup>1</sup>.

The pivot *f*<sup>1</sup> firmly fixed in *e*<sup>1</sup> extends beyond the part 1 of the bearing *h*<sup>1</sup>, and is constructed with a screw or thread (indicated by *o*<sup>1</sup> and inclined as shewn), engaging in the stationary nut *p*<sup>1</sup> in the standard *q*<sup>1</sup> properly fastened upon and to the board *n*<sup>1</sup>. The employment and operation of these parts is similar to the

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employment and operation of similar parts described herein in reference to Figs. 1 and 2 (Sheet 1). With one extremity securely attached at and to a part at the base of the cone  $e^1$ , and so as to coil within or to uncoil from the spiral groove in the said cone, is a cord  $r^1$ , which passes in a right line to and from, and coils within and uncoils from, the spiral groove of even or uniform pitch formed in the surface of the second cone or fusee  $s^1$  rotating in a second axial line parallel to the axis of the first cone  $e^1$ , and disposed or placed inversely, with respect to the difference of the diameters of its ends, to the said first cone, as shewn in Fig. 3. The other extremity of the cord  $r^1$  is securely attached to a part at the termination of the groove at the base of  $s^1$ . When the cord  $r^1$  lies within and fills the groove in  $e^1$  the said cord passes in a right line from a point near the smaller end of  $e^1$  to a point near the base of  $s^1$ , and when the same cord lies within and fills the groove in  $s^1$  the said cord passes in a right line from a point near the base of  $e^1$  to a point near the smaller end of  $s^1$ . The cone  $s^1$  is provided with a pivot  $t^1$  firmly fixed in its base, rotating in a suitable hole in the part 2 of the bearing  $h^1$ , and with another pivot  $u^1$  fixed in its smaller end, and rotating in the bearing  $v^1$  firmly fastened to  $k^1$ . In this arrangement the pivot  $t^1$  extends beyond the part 2 of the bearing  $h^1$  and is constructed with a screw or thread—(indicated by D, and inclined as shewn),—and which engages in the stationary nut  $p p$  in the standard  $q^1$ . The pivot  $u^1$  extends beyond the bearing  $v^1$ , and rotates freely and slides within a central hole in, and supports the near end of, the rod or bar  $w^1$ , and the cylindrical part  $x^1$  is carried by, and firmly secured to  $u^1$ . The pin  $y^1$  and spring  $z^1$  are employed and operate similarly to the pin  $y$  and spring  $z$  described herein in reference to Fig. 1 (Sheet 1). Sufficient space is provided between the part 2 of the bearing  $h^1$  and the bearings  $v^1$ ,—between the cone  $s^1$  and the part  $x^1$ ,—and between the part  $x^1$  and the near end of the bar  $w^1$ , to permit of an end or longitudinal movement of the screw D, pivot  $t^1$ , cone  $s^1$ , pivot  $u^1$  sliding in  $w^1$ , and the part  $x^1$ , which movement is imparted to these said parts when rotating in either direction by the movement of the screw D within the stationary nut  $p p$ ;—such said end movement being independent of the longitudinal or end movement which is imparted to the bars  $j^1$  and  $k^1$  carrying the other parts of the mechanism, by the rotation of the screw  $o^1$  in the stationary nut  $p^1$ . The pitch and spiral direction of the screws  $o^1$  and D corresponds with the spiral direction and pitch of the cones or fusees  $e^1$  and  $s^1$ , and while the cone  $e^1$  (with other parts) may rotate and move in the direction of its axis at a certain regular rate of speed, the similar axial movement of the cone  $s^1$ ,—controlled by the screw D and nut  $p p$ —is advanced or retarded in comparison with the axial movement of  $e^1$  in proportion to the difference of its speed of rotation. By this arrangement of cones (or fusees) and screws, the cord  $r^1$  always extends or stretches in a right line from one cone to the other and is kept within the grooves;—and if the said cord should stretch or elongate somewhat the conditions remain the same—hence the particular advantage of this arrangement of this invention.  $A^1$  and  $B^1$  represent two portions of cord employed, attached, and operated in the same manner as herein before described in reference to the cords A and B,—Figs. 1 and 2 (Sheet 1),—and as there stated so by this second arrangement of this invention the blind may be raised and lowered, and will remain, *in equilibrio* at any point that it may be desired that it shall rest.

Figs. 5 and 6 (Sheet 3) in plan and in elevation respectively represent an arrangement or combination of parts of mechanism illustrative of another form of this invention.

In Sheet 3,  $a^2$ ,  $a^2$  and  $a^2$  represent the slats, and  $b^2$ ,  $b^2$  and  $b^2$  the tapes of a Venetian blind suspended from the board  $n^2$  in the ordinary manner. The cords  $c^2$ ,  $c^2$  and  $c^2$  in this arrangement are also employed and operate in relation with the drum or hollow roller  $d^2$  similarly to the cords  $c$ ,  $c$  and  $c$  in relation to the roller  $d$  (Figs. 1 and 2).

$e^2$  is either a conical part (as shewn) or a conoidal or a cylindrical part rotating with, attached to, or forming a part of, the hollow roller  $d^2$ . The roller  $d^2$  and the part  $e^2$  combined as described are supported by and rotate upon parts of the rod  $f^2$

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and of the rod  $y^2$  supported respectively by the bearings  $i^2$  and  $h^2$  securely fastened upon and to the travelling bars  $j^2$  and  $k^2$ ,—the latter forming a carriage supported upon the antifriction rollers indicated by  $l^2$  rolling in the recesses  $m^2$  in the board  $n^2$ .

- 5 The rod  $f^2$  is held stationary or prevented from rotating by being flattened at the part where it drops within and fits a suitable vertical slot in the standard  $q^2$  firmly fastened to the board  $n^2$ . A suitable portion of the rod  $f^2$  slides in a corresponding hole in the bearing  $i^2$  and also in the central hole in the end  $d^2$  of the roller  $d^2$ , and extending further centrally within the roller  $d^2$  is constructed with a  
10 screw or thread indicated by  $o^2$  and inclined as shewn, which screw engages with the rotating nut  $p^2$  securely attached to the roller  $d^2$ . Beyond the screw  $o^2$  the rod  $f^2$  enters and slides in a central hole in the near end of the rod or bar  $w^2$ .

Upon  $f^2$  and firmly secured to it is also carried the cylindrical part  $e^2$ . At the other end of the bar  $w^2$  is a central rod  $y^2$  rigidly fastened in  $u^2$ .

- 15 The rod  $y^2$  rotates centrally in, and supports the rotating part  $e^2$  which, as shewn, forms one end of  $d^2$  and is supported by the bearing  $h^2$ , through which it extends to, rotates in, and is supported by, the part 1 of the bearing  $h^3$ . Firmly secured upon the rod  $y^2$ , between the bearings  $h^2$  and  $h^3$ , is a part  $s^4$  which may be conical (as shewn), conoidal or cylindrical, but when conical or conoidal its smaller end is  
20 preferably towards the smaller end of  $e^2$  as shewn. In a second axial line parallel to the axis of the part  $e^2$  and of the part  $s^4$  is a pair of cones or fusees in combination,—indicated by  $s^2$  and  $s^3$ , which may be suitably varied in figure to produce the required effect, in accordance with the figure given to the parts  $e^2$  and  $s^4$ .

- For convenience the parts  $s^2$  and  $s^3$  are united and placed base to base, so that  
25 the base of  $s^2$  may be opposite to the smaller end of  $e^2$ , and the base of  $s^3$  opposite the smaller end of  $s^4$ . In this arrangement of this invention the parts  $s^2$  and  $s^3$  are shewn in Fig. 5 as being formed with spiral grooves of even or uniform pitch, and the parts  $e^2$  and  $s^4$  as having plain surfaces, but it is also in accordance with this invention to employ grooves in all parts used as equivalents to  $e^2$ ,  $s^2$ ,  $s^3$  and  $s^4$  to  
30 retain their cords in position, and in such case the said grooves will be similar in character, as to the variation of pitch, to the grooves in  $e$  and  $s$  (Fig. 1). The united parts  $s^2$  and  $s^3$  rotate on pivots in their smaller ends, the one pivot  $t^2$  in the part 2 of the bearing  $h^3$ , and the other  $u^2$  in the bearing  $v^2$  properly secured to  $k^2$ . With one extremity securely attached at and to a suitable part at the base of  $e^2$ ,  
35 and so as to coil thereon, and uncoil therefrom, is a cord  $r^2$  which passes to and from, and coils within and uncoils from the spiral groove of even or uniform pitch in the cone or fusee  $s^2$ , and the other extremity of this cord is securely attached at and to a part at the termination of the groove at the base of  $s^2$ . Also, with one extremity securely attached at and to a part at the commencement of the groove  
40 at base of  $s^3$  is a cord  $r^3$  which passes to and from the said groove and coils upon and uncoils from the part  $s^4$ , and the other extremity of the cord  $r^3$  is securely fastened at and to a suitable part at or near the base of  $s^4$ . The cords  $r^2$  and  $r^3$  have the same relation to the parts  $e^2$  and  $s^2$  and to the parts  $s^3$  and  $s^4$  respectively as the cord  $r$  (Fig. 1) with respect to the parts  $e$  and  $s$ . The spiral spring  $z^2$   
45 surrounds and is supported by the bar  $w^2$ ,—one end of the said spring being firmly fastened to the stationary part  $x^2$ , and the other end securely attached to the rotating bar  $w^2$ . By releasing the end of the cord  $r^3$  from the part  $s^4$  and by suitably rotating the latter, the spring  $z^2$  may be properly "charged" or wound up, which being effected, the said end of  $r^3$  is re-secured to the proper part of  $s^4$ .

- 50 The cords  $A^2$  and  $B^2$  are employed and operate similarly to the cords  $A$  and  $B$  (Figs. 1 and 2), and when the blind (Fig. 6) is caused to descend, the cord  $A^2$  and the cords  $c^2$ ,  $c^2$  and  $c^2$  will uncoil from the drum  $d^2$  while the cord  $B$  coils thereon, the rotary movement of  $d^2$  and nut  $p^2$  engaging with the stationary screw  $o^2$  will cause the drum  $d^2$ , part  $e^2$  and all the other parts supported upon the bars  $j^2$  and  $k^2$   
55 supported on the rollers  $l^2$  to travel to the right, the cord  $r^2$  will coil upon  $e^2$  while uncoiling from the groove in  $s^2$ , the cord  $r^3$  will coil within the groove in  $s^3$  while uncoiling from  $s^4$ , and the spring  $z^2$  will be further "charged" or wound up, and so



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exert a greater degree of resilience or resisting power,—but, as the portion of cord passing from  $e^2$  to the groove in  $s^2$  will extend from a smaller diameter of  $e^2$  to a larger diameter of  $s^2$ ,—and, again, as the portion of cord passing from the groove in  $s^2$  to  $s^4$  will extend from a smaller diameter of  $s^2$  to a larger diameter of  $s^4$  than at the commencement of the downward movement as indicated, the leverage or mechanical advantage gained in favour of the decreased weight on the cords  $c^2$ ,  $c^2$  and  $c^2$  will compensate for the increased resisting force of the spring  $z^2$ . In raising the blind the conditions will be reversed and leverage will be gained in favour of the decreased power of the spring  $z^2$  which will compensate for the increased weight on the cords  $c^2$ ,  $c^2$  and  $c^2$ . Thus the blind may be raised or lowered, and will remain, *in equilibrio* at any point that it may be desired that it shall rest. 5 10

The chief features of novelty constituting this invention consist,—firstly, in the employment and application of a compensating cone or fusee on or in the same axial line with any rotating parts to which lifting cords are or may be attached ;—secondly, in the employment and application of a compensating cone or fusee on 15 or in the same line axially with a spring which communicates motion thereto ;—thirdly, in the employment and application of a spring rotating in the same axial line with or as a hollow roller or parts to which lifting cords are or may be attached ;—and fourthly in the employment and application of raising and lowering cords to any suitable rotating part of the mechanism. 20

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is :

Firstly ;—In mechanism for raising and supporting Venetian blinds and other similarly accumulating weight, a roller, drum or other rotating part to which lifting 25 cords are attached, combined with, or united to, a cone or fusee in the same axial line, in combination with suitable bearings or parts forming a carriage supported on antifriction rollers,—substantially as described herein, and illustrated in the accompanying drawings.

Secondly ;—In mechanism for raising any accumulating weight, a roller, drum 30 or other rotating part to which lifting cords are attached and which is combined with or united to a cone or fusee in the same axial line, both supported by bearings on a carriage supported upon antifriction rollers, in combination with a screw and nut, one of which latter is held stationary while the other imparts end motion or movement to the said carriage,—substantially as described, and shewn in the 35 accompanying drawings.

Thirdly ;—In mechanism for raising any accumulating weight, a cone or fusee in the same axial line with other rotating parts to which lifting cords are attached, in combination with another opposite cone or fusee in another axial line parallel to the former, each of the said cones or fusees having one extremity of the same cord 40 attached at or to a part at or near its base,—the available intermediate portion of the said cord, between its extremities, being coiled wholly upon the one or the other, or partly upon one and the remainder upon the other, substantially as described, and illustrated in the accompanying drawings.

Fourthly ;—In mechanism for raising any accumulating weight, a cone or fusee 45 on a second axial line parallel to the axial line of the parts to which the aforesaid lifting cords are attached, in combination with a spring operating in the same axial line, one end of which being held stationary, the other is so attached to a suitable part as to impart rotary motion, by its resilient force, to the said cone or fusee,—substantially as described, and shewn in the accompanying drawings. 50

Fifthly ;—The arrangement combination and application of the several parts of the mechanism, substantially as described, and illustrated in Figures 1 and 2 of the accompanying drawings.

Sixthly ;—In mechanism for raising any accumulating weight, a cone or fusee  $s^1$  55 on a second axial line parallel to the axial line of the parts to which the aforesaid lifting cords are attached, in combination axially with a screw and nut—one of which

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is held stationary while by the rotation of the other, an end movement along the line of its axis is imparted to the said cone or fusee, substantially as described, and shewn in the accompanying drawings.

Seventhly ;—The arrangement, combination and application of the several parts 5 of the mechanism,—substantially as described, and illustrated in Figures 3 and 4 of the accompanying drawings.

Eighthly ;—In mechanism for raising any accumulating weight a cone or fusee  $s^3$  united to or combined with the cone or fusee  $s^2$  on the same axis, in combination with another cone or fusee  $s^4$  in the same axial line as the parts to which the lifting 10 cords are attached,—each of the cones or fusees  $s^3$  and  $s^4$  having one extremity of the cord  $r^3$  attached to a part at or near its base,—substantially as described, and illustrated in the accompanying drawings.

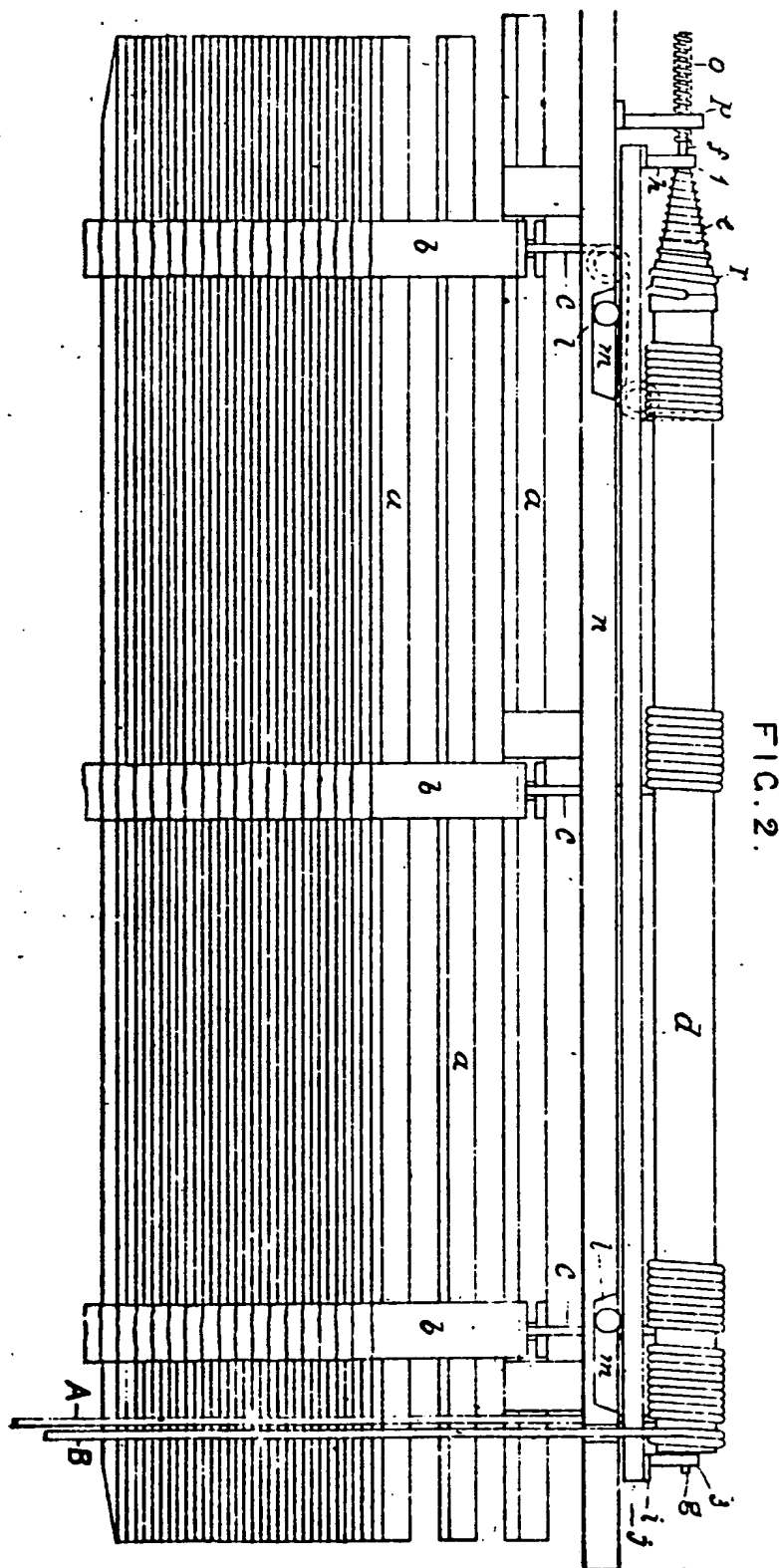
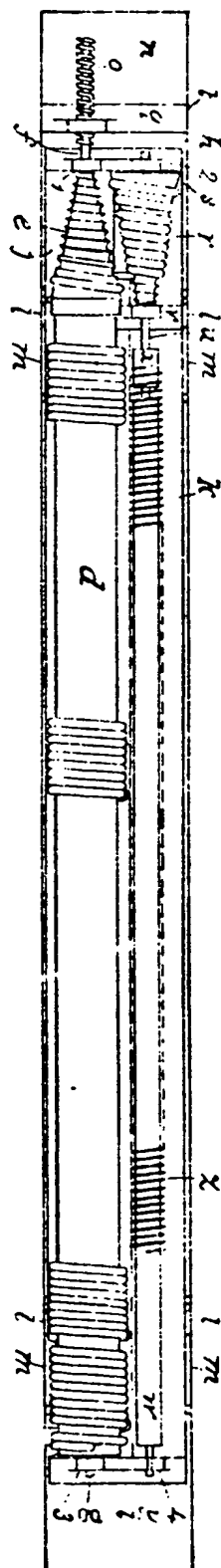
Ninthly ;—In mechanism for raising any accumulating weight, a cone or fusee in the same axial line as the parts to which lifting cords are attached, (but rotating 15 independently of these parts), in combination with a spring which communicates motion thereto, all operating in the same axial line,—substantially as described, and shewn in the accompanying drawings.

Tenthly ;—The arrangement, combination and application of the several parts 20 of the mechanism,—substantially as described, and illustrated in Figures 5 and 6 of the accompanying drawings.

Eleventhly ;—The arrangement and application of the cords A and B in combination with any suitable rotating part in mechanism wherein compensating cones or fusees are employed,—substantially as described, and shewn in the accompanying drawings.

25 Dated this Twenty-eighth day of April 1893.

JOSEPH SAMUEL ORTON.



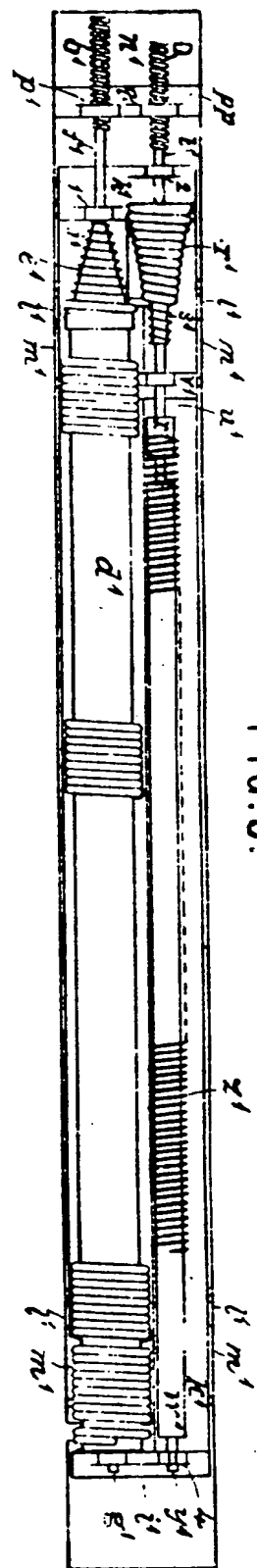


FIG. 3.

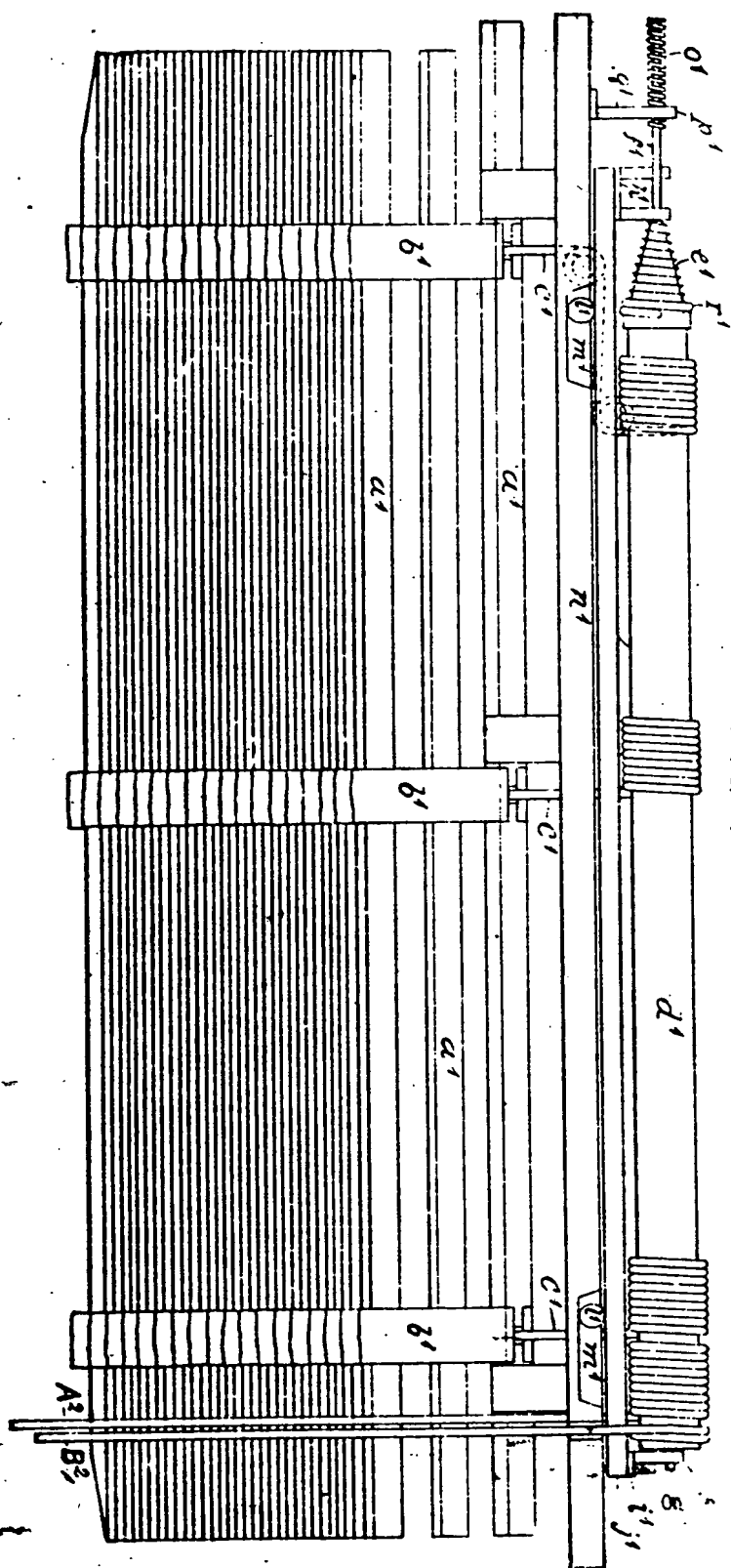


FIG. 4.

[This Drawing is a reproduction of the Original on a reduced scale.]

FIG. 5.

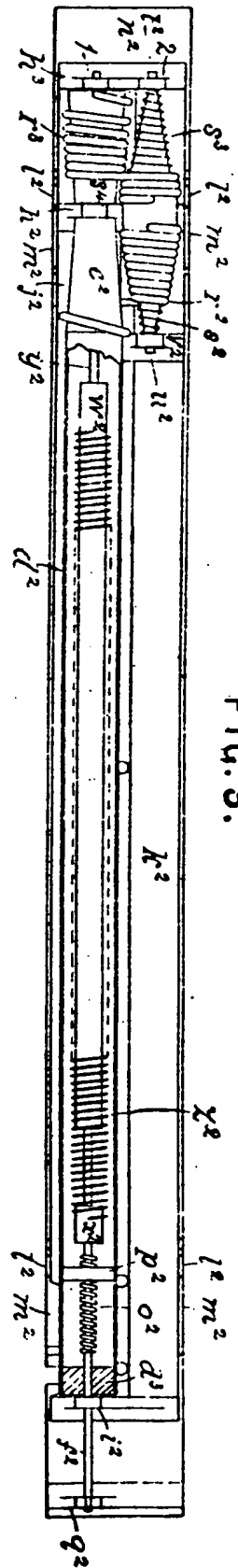


FIG. 6.

